

The 2nd International Symposium on Nuclear Energy (ISNE-09)

October 26-28, 2009 • Amman, Jordan

"Nuclear Safety, Security and Human Resources" – Nuclear Education, Tutoring and Training

The NUCLEONICA nuclear science portal
for knowledge management, education, and training
(www.nucleonica.net)

J. MAGILL

*European Commission, Joint Research Centre,
Institute for Transuranium Elements,
Postfach 2340, 76125 Karlsruhe, Germany*



What is NUCLEONICA?

- NUCLEONICA is a new nuclear science web portal from the European Commission's Joint Research Centre. The portal provides a customisable, integrated environment and collaboration platform for the nuclear sciences using the latest internet "Web 2.0" dynamic technology.
- NUCLEONICA is aimed at professionals, academics and students working with radionuclides in fields as diverse as the life sciences (e.g. biology, medicine, agriculture), the earth sciences (geology, meteorology, environmental science) and the more traditional disciplines such as nuclear power, health physics and radiation protection, nuclear and radiochemistry, and astrophysics.



The screenshot shows the NUCLEONICA web portal interface. At the top, there is a navigation bar with links: Home, Sitemap, About us, EN ISO 9001:2000, and Legal Notice. The main header features the NUCLEONICA logo and the tagline "... web driven nuclear science". Below the header, there is a login section with fields for "username" and "password", and a "Login" button. The main content area is divided into several sections:

- Welcome**: A sidebar menu with links to Home, Free Access, Nucleonica [wiki], Karlsruhe Nuclide Chart, News Releases, Educational Resources, Training Courses, Ask an Expert, About Us, and Contact.
- Nucleonica - web driven nuclear science**: A central section featuring a large image of a hand pointing at a periodic table of elements.
- NUCLEAR NEWS**: A section with three news items:
 - Terror suspect 'had other targets'**: An alleged plane bomb plot suspect had "limitless ambitions" and had other targets, a jury heard. [..]
 - War and peace**: Worse was to follow for Mr. Carter with the Islamic revolution in Iran and the seizure of the hostages at the US embassy in Tehran. President Carter tried to get their release through ineffective sand [..]
 - Kuwait eyes nuclear power with French help - paper**: KUWAIT (Reuters) - Kuwait is considering developing nuclear power with the help of a French firm to meet demand for electricity and water desalination, a Kuwaiti newspaper quoted the country's ruler a [..]
 - Airliner bomb trial: 'Terrorist had limitless ambitions'**: An alleged terrorist Assad Ali Sanwar involved in a plot to use homemade bombs to blow up transatlantic flights between London and North America had "limitless ambitions" a court has been told. [..]
 - Nuclear claim in 'bomb plot' case**: An alleged terrorist accused of a bomb plot researched other
- NUCLEONICA HOT TOPICS**: A section with a link to "New Nucleonica Training Course" dated January 31, 2009. The text describes the 1st Advanced Training Course on Illicit Trafficking and Consequence Management with NUCLEONICA, which will take place on the 22-24th April 2009 at the Institute for Transuranium Elements, Karlsruhe.
- Footer**: The JRC European Commission logo.

Home | Sitemap | About us | EN ISO 9001:2000 | Privacy Statement | Legal Notice

nucleonica ... web driven nuclear science


Wednesday, September 30, 2009

Home

username Login

- Welcome
- Free Access
- Nucleonica [blog]
- Nucleonica [wiki]
- Karlsruhe Nuclide Chart
- News Releases
- Educational Resources
- Training Courses
- Ask an Expert
- FAQ
- About Us
- Contact

Nucleonica - web driven nuclear science



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NUCLEONICA provides "software as a service" on the web rather than through installed software, adding a greater level of stability and security and avoiding version compatibility and update problems. In addition, all NUCLEONICA's web applications are browser and operating system independent and can therefore be accessed by most web browsers.

NUCLEONICA offers the following main features:

NUCLEONICA HOT TOPICS

>> New Nucleonica Training Course... ITRAC-2

August 17, 2009

The 2nd Advanced Training Course on Illicit Trafficking and Radiological Consequences (ITRAC-2) with NUCLEONICA will take place at ITU, Karlsruhe from

KARLSRUHE NUCLIDE CHART

>> Karlsruhe Nuclide Chart special event on 9th Dec. 2008

January 09, 2009

New book now available!...for more information click link

NUCLEAR NEWS

N-energy benefits should not remain confined to few: PM

SEP 30 Manmohan Singh today said benefits of atomic energy should not remain confined to a 'privileged few' as it was vital to meet power requirements of developing countries. [...]

For sale: Fisherman's cottage in nature reserve (Oh, and it's next to two nuclear power stations)

SEP 30 For sale: Fisherman's cottage in nature reserve (Oh, and it's next to two nuclear power stations) [...]

Analysis: Iran plant could defer Israel strike

SEP 30 JERUSALEM (AP) -- It may seem counterintuitive, but the news that Iran has a second, clandestine uranium enrichment plant, and has just test-fired long-range missiles, could actually put off any plans [...]

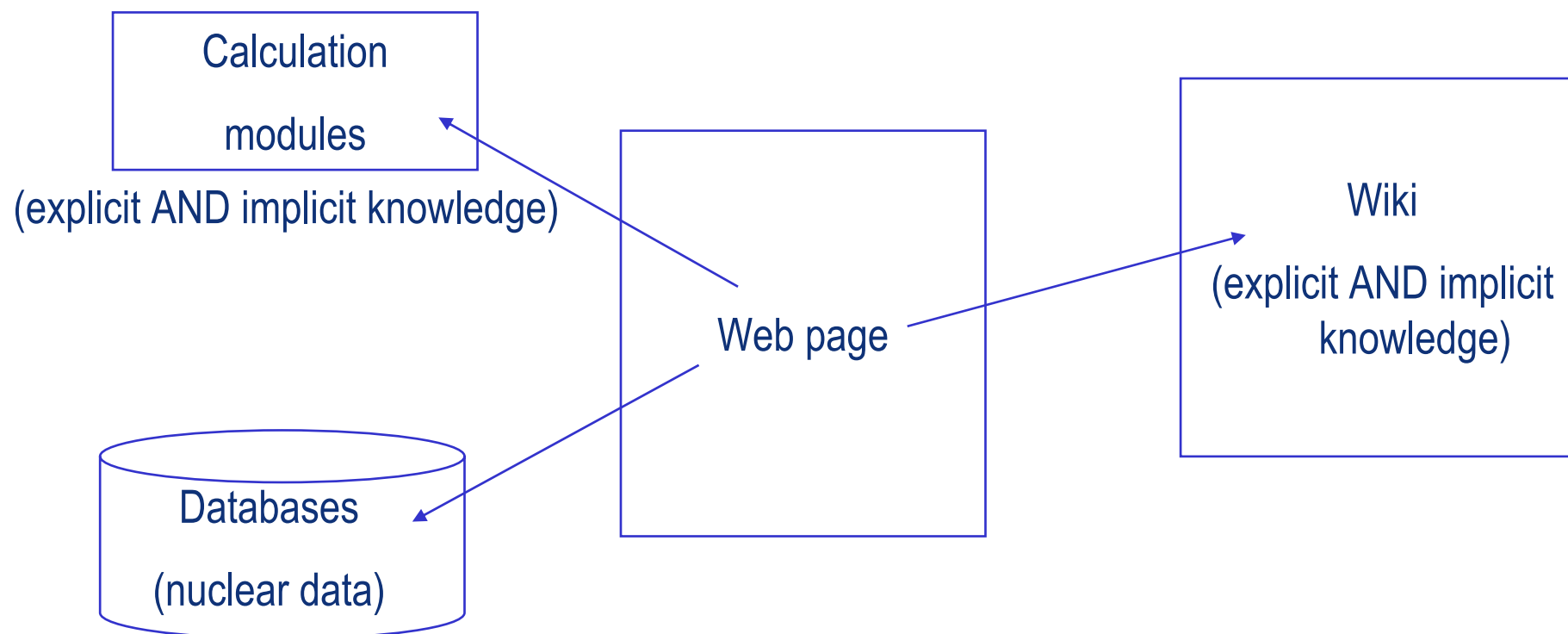
India's allotment for nuclear parks hailed

SEP 30 The US India Business Council has welcomed India's move to reserve sites for the US commercial nuclear technology and described it as a significant step towards implementing the US-India civil nuclear [...]

Bulgaria Belene Nuclear Plant to Bring EUR 80 B over 60 years

SEP If built, the Bulgarian Belene

Nucleonica Architecture & Logical Structure...



The NUCLEONICA Structure

NUCLEONICA

- NUCLEONICA's "Learning Centres"
- Unique feature: Web-based Nuclear Science Applications
- New Approach to Knowledge Management, Education and Training: use of social networking tools
- NUCLEONICA as a platform for scientific applications development



Home | Sitemap | About us | EN ISO 9001:2000 | Legal Notice

Wednesday, February 18, 2009

Home

username: ***** Login

Welcome

Free Access

Nucleonica [wiki]

Karlsruhe Nuclide Chart

News Releases

Educational Resources

Training Courses

Ask an Expert

About Us

Contact

NUCLEONICA - web driven nuclear science

NUCLEAR NEWS

Terror suspect 'had other targets'

FEB 18 An alleged plane bomb plot suspect had "limitless ambitions" and had other targets, a jury heard. [...]

War and peace

FEB 18 Wars was to follow for Mr Carter with the Islamic revolution in Iran and the seizure of the hostages at the US embassy in Tehran. President Carter tried to get their release through ineffective sand [...]

Kuwait eyes nuclear power with French help - paper

FEB 18 KUWAIT (Reuters) - Kuwait is considering developing nuclear power with the help of a French firm to meet demand for electricity and water desalination, a Kuwaiti newspaper quoted the country's ruler a [...]

Airliner bomb trial: 'Terrorist had limitless ambitions'

FEB 18 An alleged terrorist Assad Ali Samar involved in a plot to use homemade bombs to blow up transatlantic flights between London and North America had "limitless ambitions" a court has been told. [...]

Nuclear claim in 'bomb plot' case

FEB 18 An alleged terrorist accused of a bomb plot researched other

NUCLEONICA HOT TOPICS

>> New Nucleonica Training Course

January 31, 2009

1st Advanced Training Course on Illicit Trafficking and Consequence Management with NUCLEONICA will take place on the 22-24th April 2009 at the Institute for Transuranium Elements, Karlsruhe

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Four Pillars of NUCLEONICA: Nucleonica's "Learning Centres"

• Data Centre

Nuclear Data Retrieval

Nucleonica/IEFF-3.1 EGAF Prompt Gammas ICRP 8th Table of Isotopes

Select Database: Nucleonica

Nuclide Search Radiation Search Advanced Search

Radiation Search – Search Variables & Range

☒ Gamma and X-Rays Energy: 300 +/- 1 keV
☐ Alpha 600 +/- 1 keV
900 +/- 1 keV

Z: Element: Mass number: Half-life: Seconds Seconds

Search Save to my defaults Reset

Search returned 6 results
Number of nuclides (ground + isomeric states): 2

Nuclides	Gamma and X-Rays (keV)	Emission Probability	Half-life
60 Nd 151	900.2	0.001463	12.44 (± 7) m
95 Am 241	899	6.84E-10	432.8 (± 7) y
60 Nd 151	600.8	0.0002527	12.44 (± 7) m
95 Am 241	599.6	2.232E-09	432.8 (± 7) y
60 Nd 151	300.58	0.018221	12.44 (± 7) m
95 Am 241	300.2	1.188E-07	432.8 (± 7) y

• Knowledge Centre

Nucleonica Networking

- Start
- My Profile
- My Contacts
- My Mailbox
- My Groups

Free Applications

- Forum
- Conference Calendar
- Graphics Module

Upgrade Applications

- Nuclear science

Coming soon

- Open call for JRC Traineeships
- Review of Nucleonica in NKS news 2007/3
- Proceedings of the 9th Nucleonica Training Course now available

Open call for JRC Traineeships
November 14, 2007
ITU's first open call for JRC-Traineeships has been published on our website. The deadline for applications is 6 December 2007 (midnight). In particular we have a position for assistance in the development of an electronic version of the Karlsruhe Nuclide Chart. For more details...

US talks tough over Iran, warns China
The US has pledged to step up its drive for new UN sanctions on Iran and warned China against blocking diplomatic efforts to halt the Islamic republic's nuclear ambitions.
Source: expressindia Language: EN Date: 2007-11-16T07:41+0100

North and South Korea to launch regular cross-border train service
The train service, limited to freight, will launch next month for the first time in more than half a century.
Source: HT Language: EN Date: 2007-11-16T07:31+0100

US talks tough on Iran, warns China
WASHINGTON (AFP) - The United States accused Iran Thursday of "stringing along" UN watchdogs investigating its nuclear ambitions and bluntly warned China not to block new sanctions against the Islamic republic.
Source: ntp-english Language: EN Date: 2007-11-16T07:10+0100

IAEA gives clean bill to Iran on its plan
Vie posted at: 11/16/2007 8:12:22 Source: AP Vienna - A report from the UN nuclear watchdog agency yesterday found Iran to be generally truthful about key aspects of its nuclear history, but it warned that its knowledge of Tehran's present atomic work was shrinking.
Source: thepeninsulapost Language: EN Date: 2007-11-16T08:30+0100

Welcome, Joe
Edit Preferences
My Profile My Community
My Community Events
You have 0 new messages
You have 0 new contact list requests
Recent Nucleonica Members
Vina Golu Constantin Dubale
Adrien Tsinotte Brzila Lozaneau

• Application Centre

nucleonica ... web driven nuclear science

Applications My Preferences Help New Alerts

Nuclide Explorer

Actual Chart Karlsruhe

Search Nucleonica Documentation

Nuclear Data Retrieval

Application Centre

- Mass Activity Calculator
- Decay Engine
- Dosimetry & Shielding
- Range & Stopping Power
- webKORIGEN
- Universal Nuclide Chart
- Transport & Packaging
- Nuclide mixtures
- Nucleonica Scripting
- Library creation for 3rd party software
- Radiological Dispersion Module
- Extended Graph Module

Data Centre

- Physical Constants
- Nuclide Datasheets
- Nuclide Derived Data
- Average Cross Sections
- Radiations
- Prompt Gamma
- Fission Yields

Knowledge Centre

- Nuclear News
- Reading room
- Useful Weblinks
- Ask An Expert

Welcome, Joe
Edit Preferences Administration
MyCommunity Portal
My Last Nuclides
82 Pb210
88 Ra226
55 Cs137
40 Zr95
84 Po210
My Nuclide Mixtures
Ra-226 + daughters (1g at 1y)
Decay Engine Result
Rb-81 + daughters (190 MBq)
Rb81(1g)+Kr81m
Transuramics in 1 ton Spent Fuel (4.2% enriched, 50GWd/t, 6 years cooling)
My Sources
natu
My Messages
Maintenance Work
IAEMLS-9 International Conference on Nuclear Analytical Methods in the Life Sciences
Request for photos of non-stable elements
User Alerts

• Community/Networking Centre

Community Members Pending Contacts

all users my Contacts

Image	Name	Organization
	HARTINA ADORNI	University of Pisa - DIMNP - GRNSRG
	Alexandra Schwenk-Ferrero	Forschungszentrum Karlsruhe - Institute for Nuclear and Energy Technologies
	Mikael Andersson	Westinghouse Electric Sweden AB
	Martin Badertscher	
	Ramiguz Baranczyk	European Commission DG TRIS
	Enrico Barbina	Nable Progetti Srl
	Valerio Barbina	Nable Progetti Srl
	Björn Becker	Forschungszentrum Karlsruhe GmbH, Institut fuer Reaktorsicherheit
	Fabio Belloni	European Commission, DG-JRC, Institute for Transuranium Elements
	Andrey Berlov	Institute for Transuranium Elements, EC JRC
	Yuri Blodid	Forschungszentrum Dresden-Rossendorf
	Emilie BOISE	CEA
	Berkan Cetinkaya	Ege University, Institute of Nuclear Sciences
	Vanessa Chidi	
	Catalina Chitu	

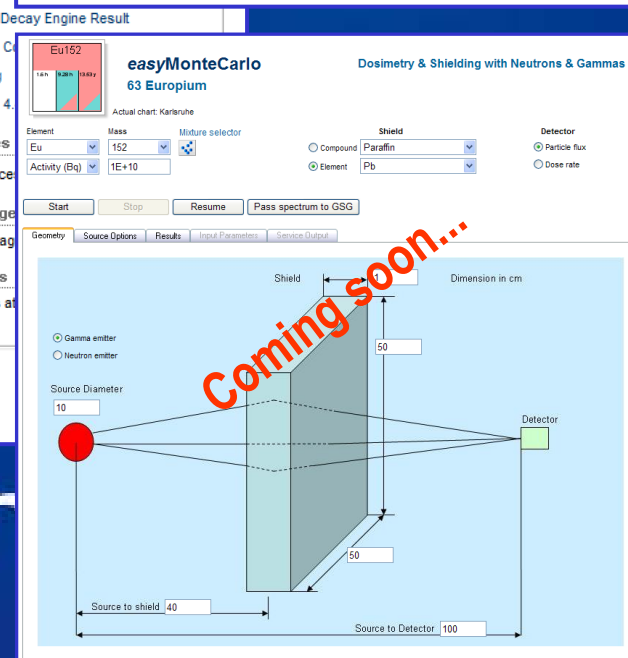
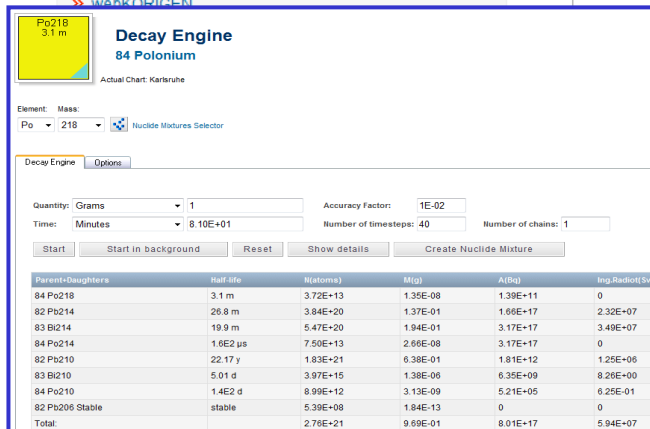
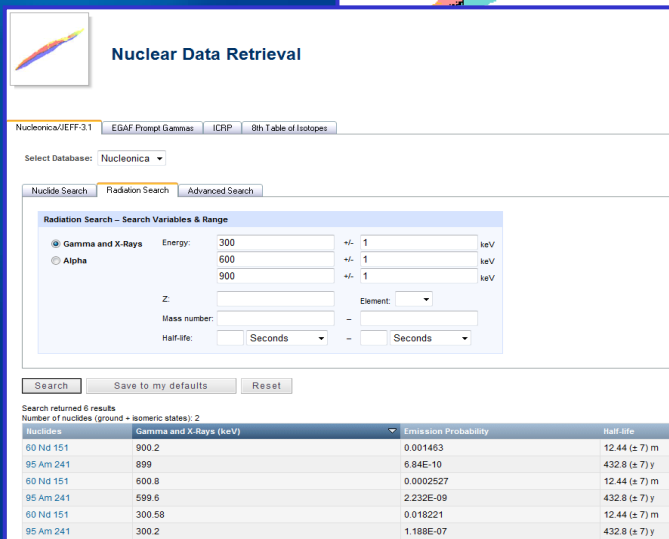
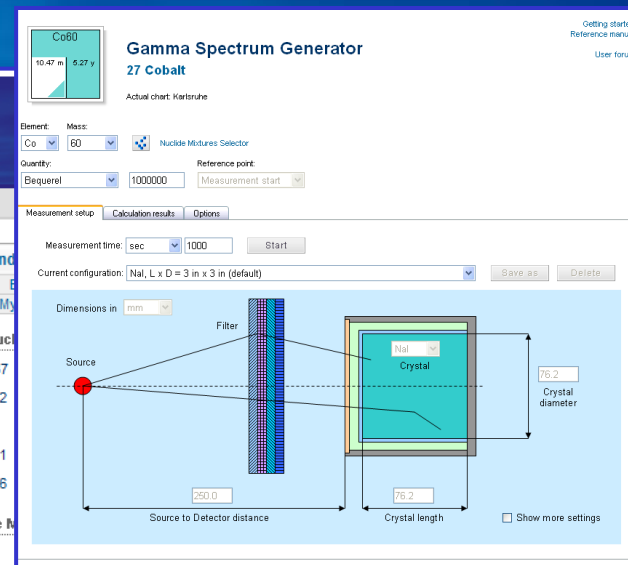
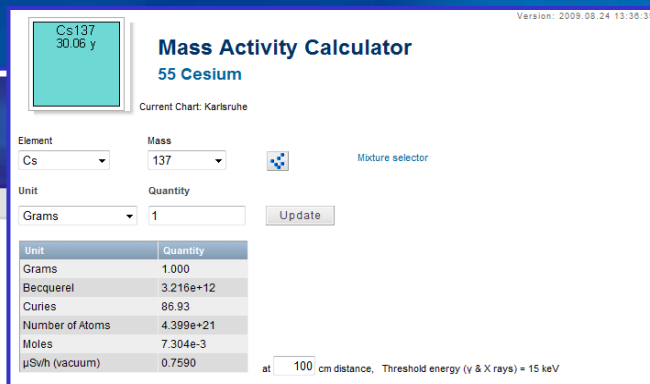
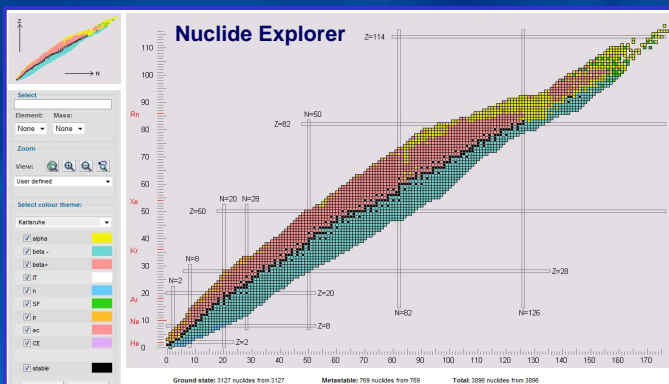
Profile Contacts

Simon Jerome National Physical Laboratory

Send message Add to Your Contact List

Name: Simon Jerome
Location: United Kingdom
Nationality: British
Organization: National Physical Laboratory
Job Title: Head of Radiochemistry
Area of Interest: Radiochemistry, Analytical Chemistry, Radiochemical Analysis, Low-level radioactivity measurement, Inter-laboratory comparisons and proficiency testing, ISO 17225:2005 Technical Assessor, ISO Guide 43
E-Mail: simon.jerome@npl.co.uk

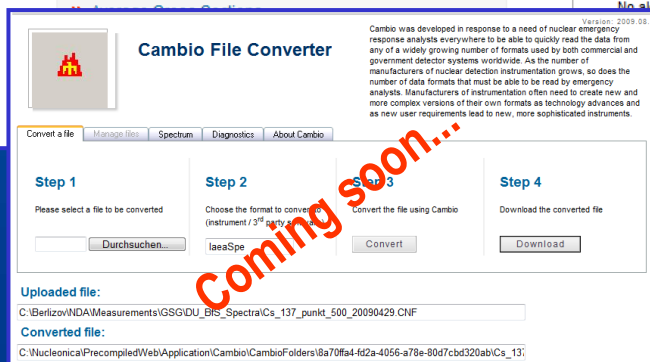
Nucleonica's unique feature: Web-based Nuclear Science Applications



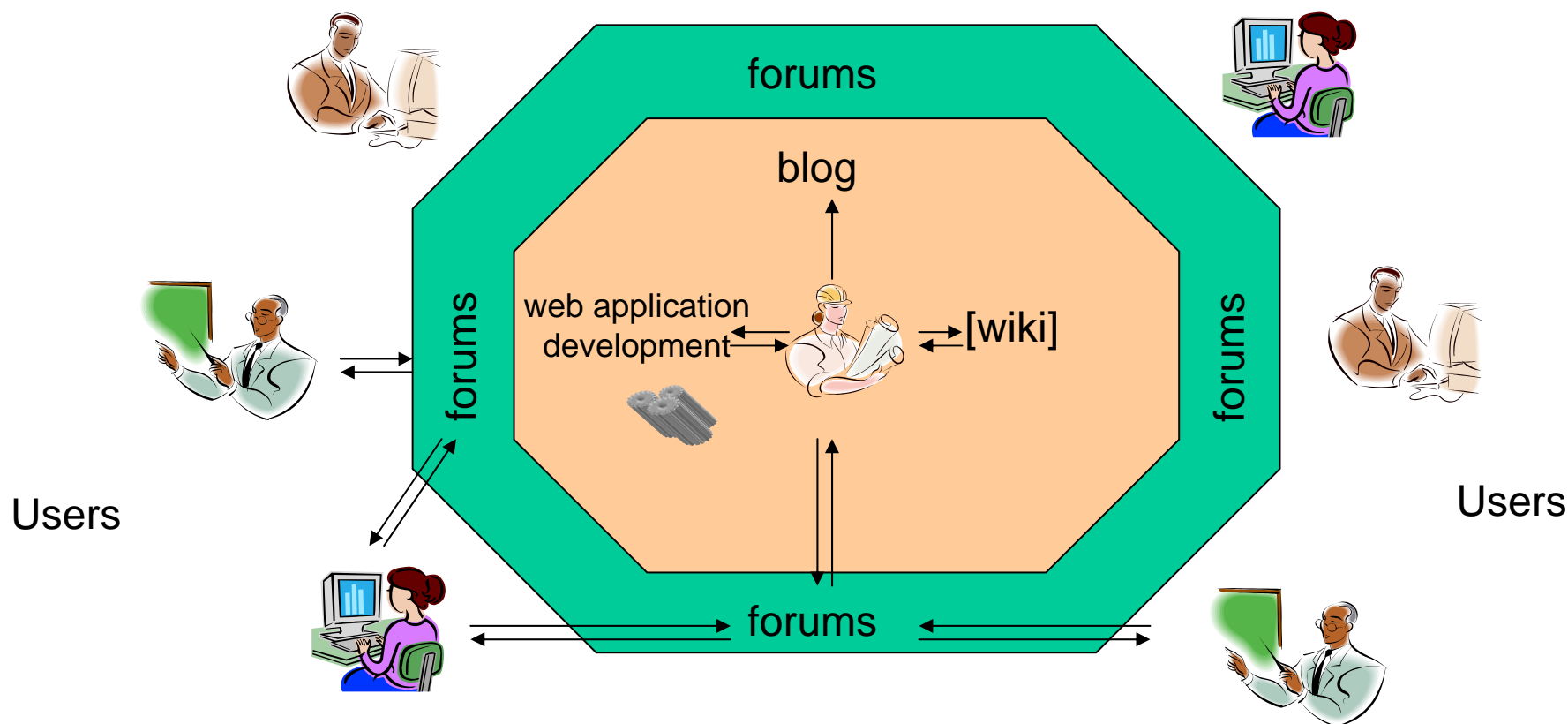
Other Applications:

- Dosimetry & Shielding,
- Range & Stopping Power,
- webKORIGEN...

Coming soon...



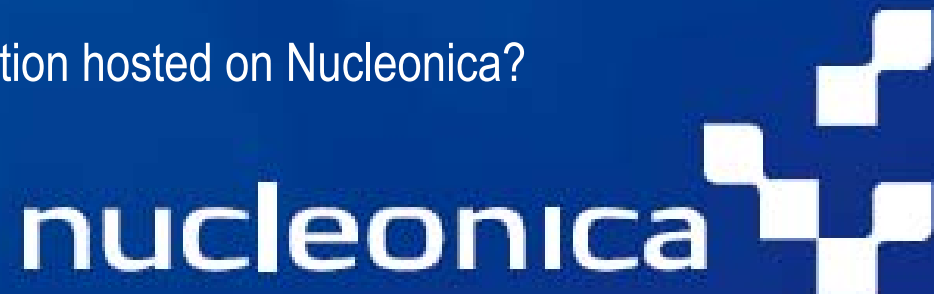
NUCLEONICA Knowledge Management: Tacit → Explicit Knowledge through the development of communities around the scientific applications (based on Web 2.0 tools)



NUCLEONICA as a platform for scientific applications development

- Currently NUCLEONICA consists of individual modules
- Modules can be “combined” for batch processing through the NUCLEONICA scripting language
- Open up NUCLEONICA to external developers
checklist of tools required:
 - access to the NUCLEONICA databases
 - a testing environment where the developer and the NUCLEONICA team can test new application
 - an upload facility whereby the developer can upload the application to the NUCLEONICA platform

Are you interested in having your application hosted on Nucleonica?
Contact us...



October 2007 Karlsruhe

[edit]

9th Nuclear Science Training Course with Nucleonica, 25/26th Oct. 2007, Ostendorfhaus, Karlsruhe

The 9th Nuclear Science training course on Radioactivity, Radionuclides and Radiation with Nucleonica was held at the Ostendorfhaus, Karlsruhe from the 25th to 26th October, 2007. The two-day course provided a general introduction to the recently released Nucleonica: the new science networking and applications portal. Nucleonica is a powerful and versatile web-based software package for the nuclear science community. With examples and exercises, a variety of core and topical issues in nuclear science and technology were presented by experts in their respective fields.

A total of twenty-nine participants, around half of them women, with a diverse range of backgrounds attended the course. There were participants from Azerbaijan, Belgium, Bulgaria, Czech Republic, Poland, Romania and Turkey. In addition there were 10 participants from the Institute for Transuranium Elements. Among them were students, academics and industry professionals from fields such as nuclear medicine, radiation protection, environmental radioactivity and reactor physics.

[Final Agenda 25th Oct. 2007](#)

[How to get from the hotel to the conference training centre](#)

[Links to the presentations and exercises:](#)

[Networking with Nucleonica \(J. Magill\) Exercises](#)

[Nuclear Data \(J. Galy\) Exercises](#)

[Nuclide Charts \(C. Normand\) Exercises](#)

[Decay Engine \(A. Berlizov\) Exercises](#)

[Dosimetry & Shielding \(J. Galy\) Exercises](#)

[Nuclear Forensics & Illicit Trafficking \(K. Mayer\) Exercises](#)

[Overview of the Institute for Transuranium Elements \(F. Wastin\)](#)

[Advanced Nucleonica Features \(J. Magill\)](#)

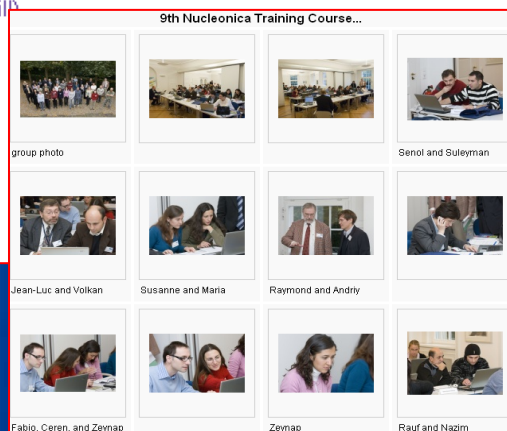
[Training Course Feedback](#)

[QM Questionnaire](#)

[Course Certificate](#)

[List of Participants](#)

[Gallery](#)

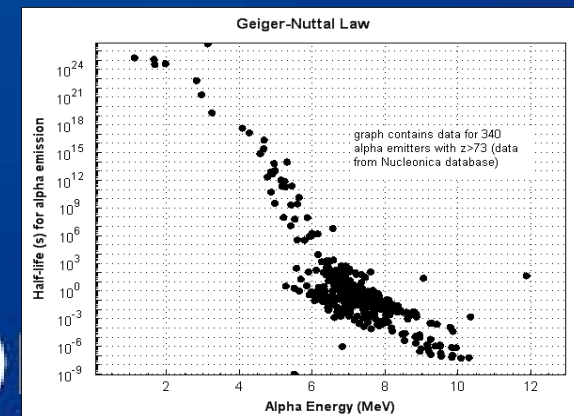
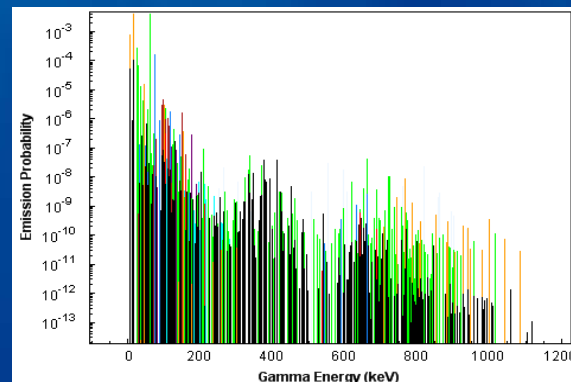
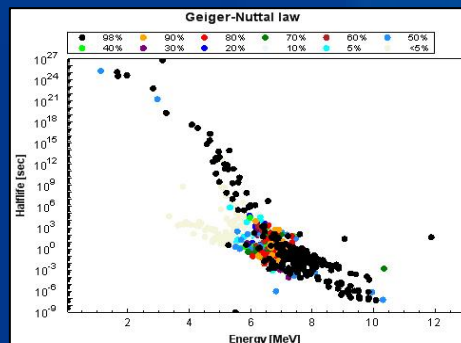
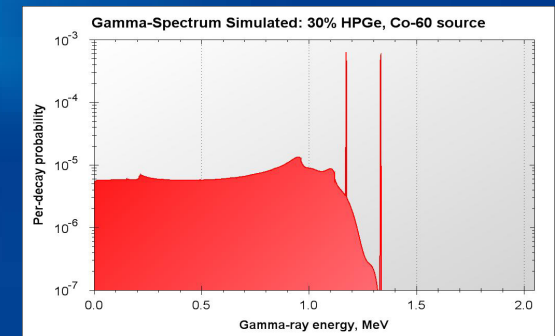
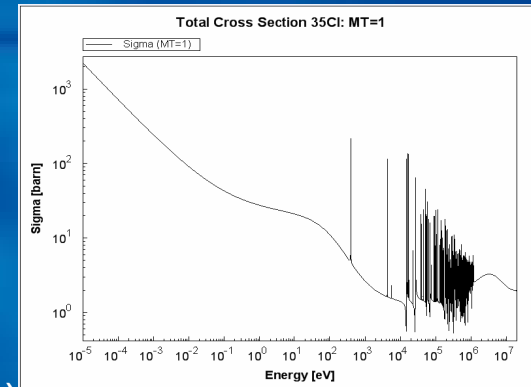


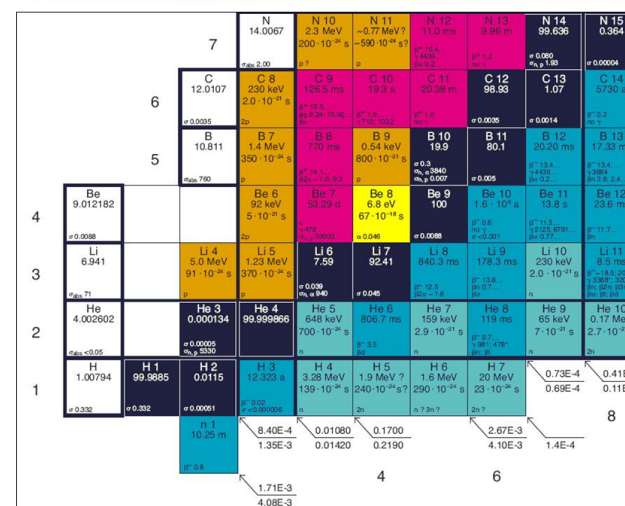
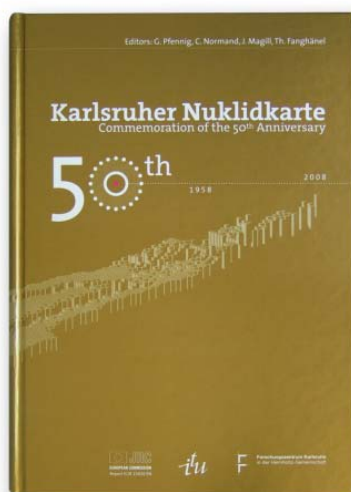
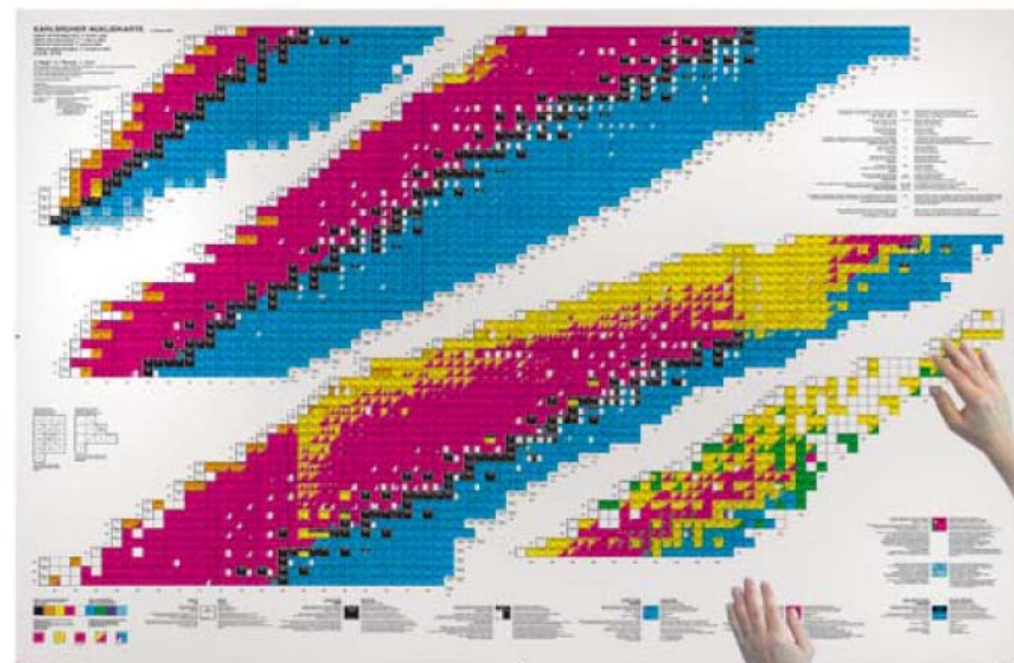
nucleonica

webGraphics...

The Nucleonica webGraphics Features:

- No need to buy expensive commercial software
- Easy to use
- Delivers publication quality scientific graphs
- Variety of formats available (gif, jpg, emf, eps, png, svg)
- Graphics configuration can be stored for future use
- Available at any time from any location
- Under constant further development





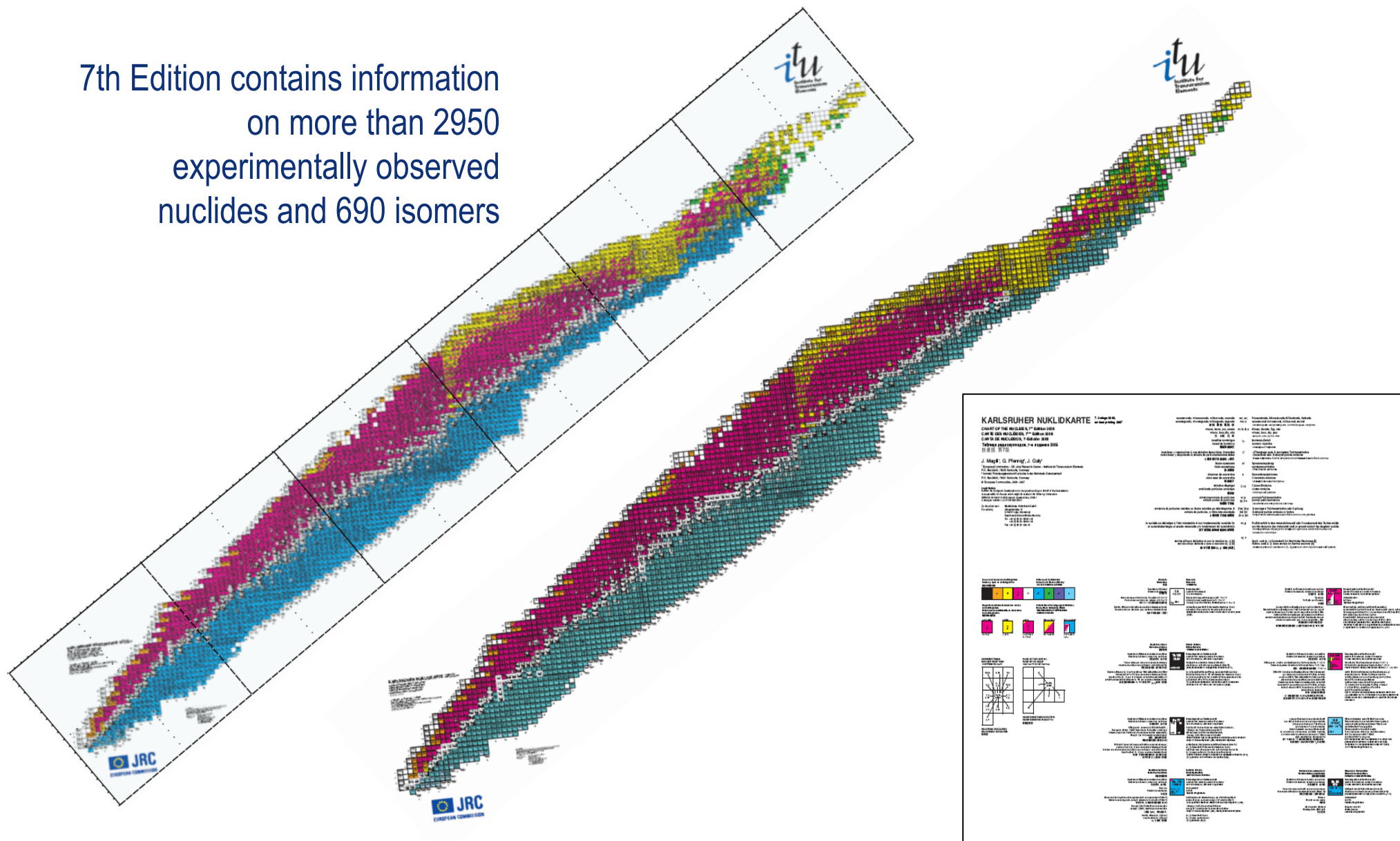
Use of colours in the Karlsruhe Nuclide Chart:

Already in the first Edition of the Karlsruhe Chart of the Nuclides, colours were used to indicate the decay modes

black = stable nuclide;
 yellow = α -decay;
 red = β^+ decay or electron capture;
 blue = β^- decay;
 white = isomeric transition).

Bi 207 31.55 a ϵ β^+ ... γ 570; 1064; 1770...	Bi 208 $3.68 \cdot 10^5$ a ϵ γ 2615	Bi 209 100 $1.9 \cdot 10^{19}$ a α 3.137 σ 0.011 + 0.023 $\sigma_{n,\alpha} < 3E-7$
Pb 206 24.1 σ 0.027	Pb 207 22.1 σ 0.61	Pb 208 52.4 σ 0.00023 $\sigma_{n,\alpha} < 8E-6$
Tl 205 70.48 σ 0.11	Tl 206 3.7 m 4.20 m I_γ 686; 453; 216; 256; 1021... β^- 1.5... γ (803...)	Tl 207 1.33 s 4.77 m I_γ 1000; 351 β^- 1.4... γ (898...)

7th Edition contains information
on more than 2950
experimentally observed
nuclides and 690 isomers



Highlights:

Gamma Spectrum Generator

webKORIGEN

Gamma Spectrum Generator... can be used to simulate the gamma spectrum of radioactive substances with a variety of detectors (e.g. NaI, HPGe, etc.). The simulator presents an efficient visual teaching aid that is especially useful in training facilities which have restrictions on the use of radioactive substances, or when sources of special interest are not available.

of interests for...

- nuclear and radio-chemists,
- health physicists,
- nuclear facility operators,
- radiation protection staff,
- safeguards inspectors,
- border police,
- customs and law-enforcement officers.

Needs for **Education & Training** in these areas are high and, obviously, they will be increasing in the future as new challenges arise, such as

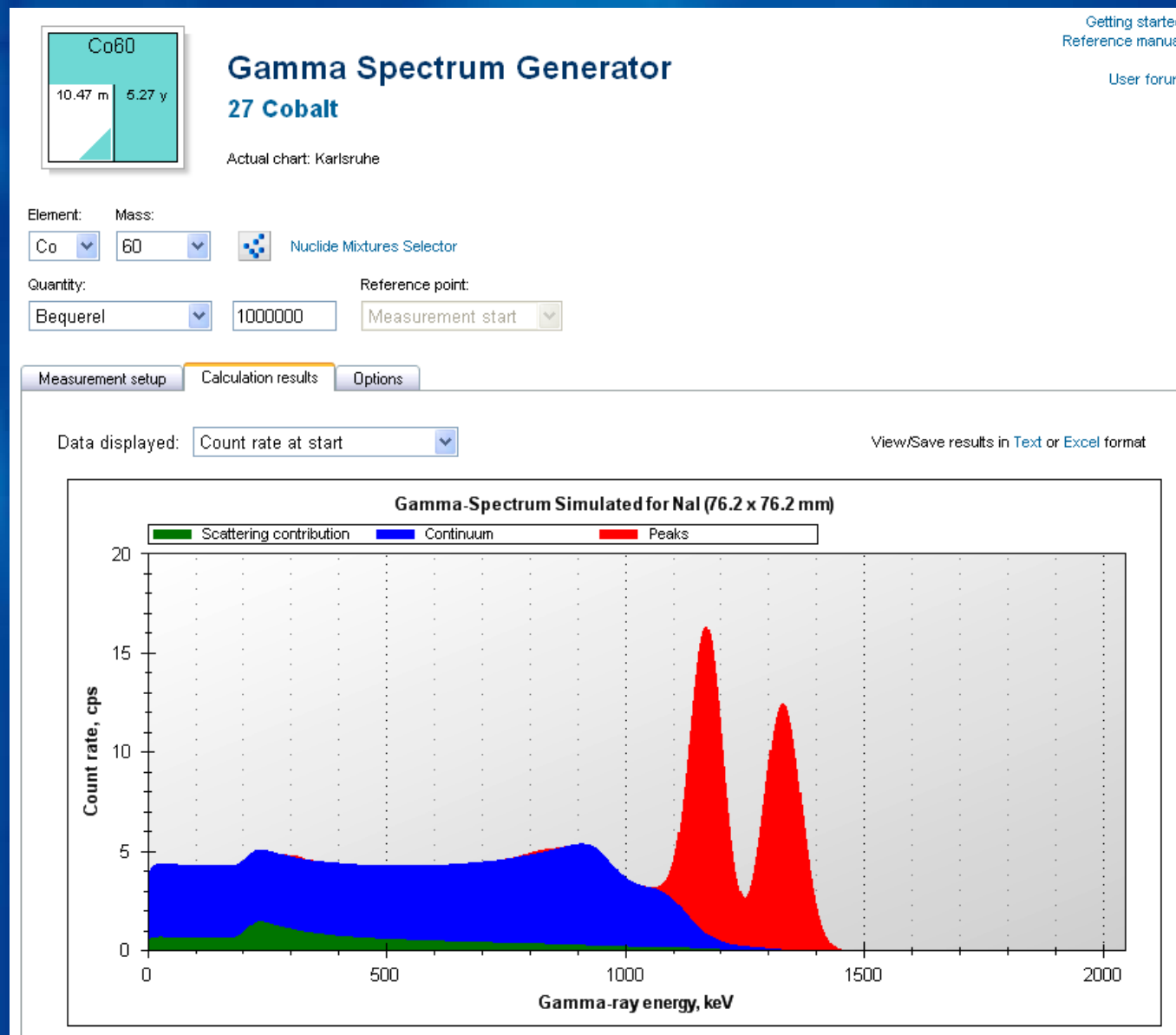
- strengthening international safeguards and security,
- nuclear terrorism prevention

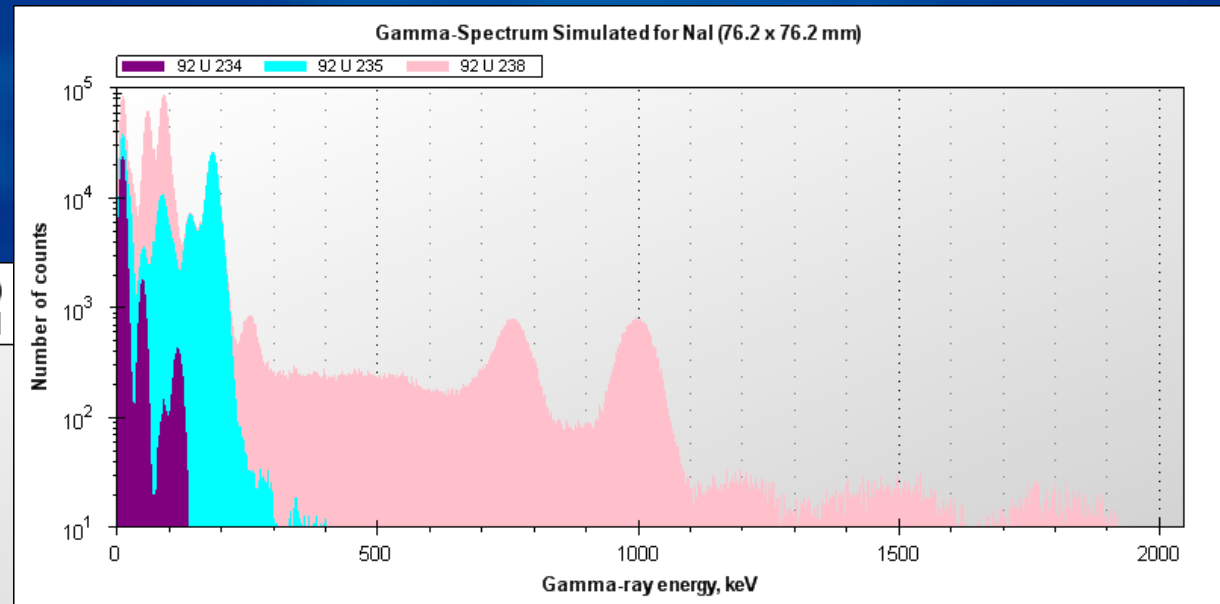
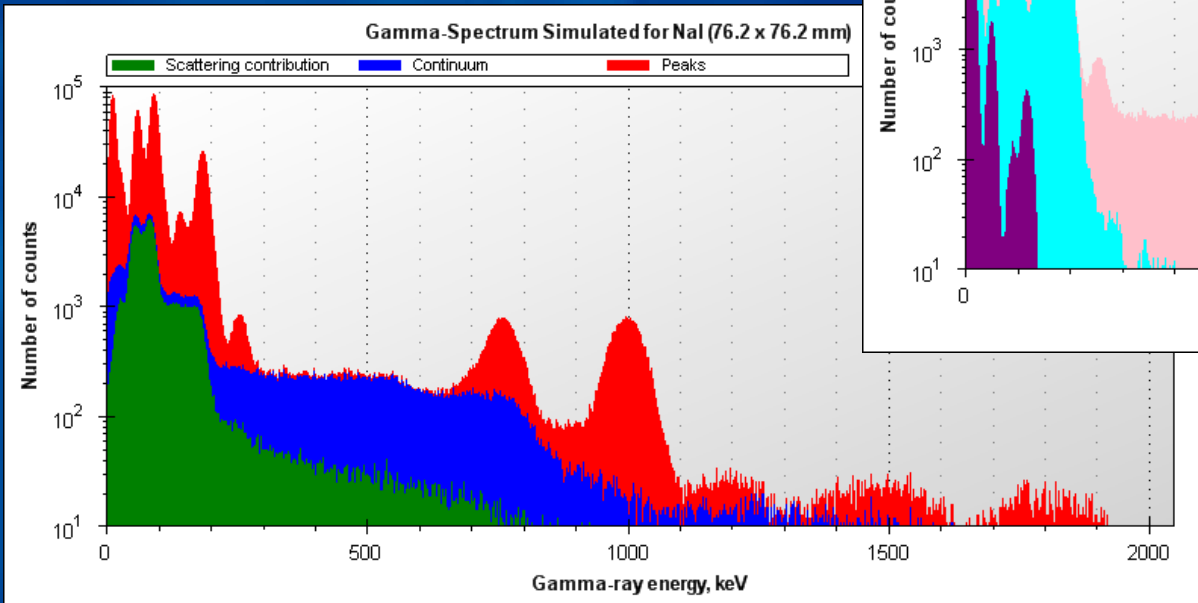
The screenshot shows the 'Gamma Spectrum Generator' web application. The header features the 'nucleonica' logo and the tagline '... web driven nuclear science'. Navigation links include 'Applications', 'My Preferences', 'Print', and 'Help'. On the right, there are links for 'Getting started', 'Reference manual', and 'User forum'.

The main content area is titled 'Gamma Spectrum Generator' and '27 Cobalt'. It includes a small thumbnail of a gamma spectrum for Co60 with half-life values of 10.47 m and 5.27 y. Below this, there are input fields for 'Element' (Co), 'Mass' (60), 'Quantity' (Bequerel), and 'Reference point' (Measurement start). A 'Nuclide Mixtures Selector' button is also present.

The 'Measurement setup' tab is active, showing 'Measurement time' set to 1000 seconds and a 'Start' button. The 'Current configuration' is set to 'NaI, L x D = 3 in x 3 in (default)'. Below this is a schematic diagram of the detector setup. The diagram shows a 'Source' (red dot) at a 'Source to Detector distance' of 250.0 mm. A 'Filter' is placed between the source and the detector. The detector is a 'NaI Crystal' with a 'Crystal length' of 76.2 mm and a 'Crystal diameter' of 76.2 mm. A 'Show more settings' checkbox is located at the bottom right of the diagram.

This “one-click” calculation simulates the spectrum for a 10 MBq ^{60}Co γ -source located at 25 cm distance from unshielded 3" x 3" NaI detector. A typical result of the calculation is shown...





The γ -spectrum modelled for a 10-year-aged natural U sample and 3"×3" NaI detector. The two diagrams show different presentations of the same spectrum. The top diagram shows the separate contributions from the parent and daughters of U-234, U-235, U-238. The bottom diagram shows the contributions from the peak and continuum components of the spectrum.

easyMonteCarlo:

easy to use, fast, accurate dosimetry and shielding calculations for gammas and neutrons using Nucleonica's powerful Monte Carlo engine. Investigate the effects of self-attenuation in the source, build-up effects in the shield etc., on the dose rate and the particle flux distribution at the detector...

NUCLEONICA's *easyMonteCarlo* web-page showing the currently implemented shielding geometry...


nucleonica ... web driven nuclear science

Applications My Preferences Print Help

easyMonteCarlo
27 Cobalt

Dosimetry & Shielding with Neutrons & Gammas
Version: 2008.10.13 16:1

Actual chart: Karlsruhe

Element: Co Mass: 60 Mixture selector: 
Activity (Ci): 1

Shield:
☐ Compound Paraffin
☒ Element Fe

Detector:
☐ Particle flux
☒ Dose rate

Start Stop Resume

Geometry Source Options Results Input Parameters Service Output

Gamma emitter
Neutron emitter

Source Diameter: 10

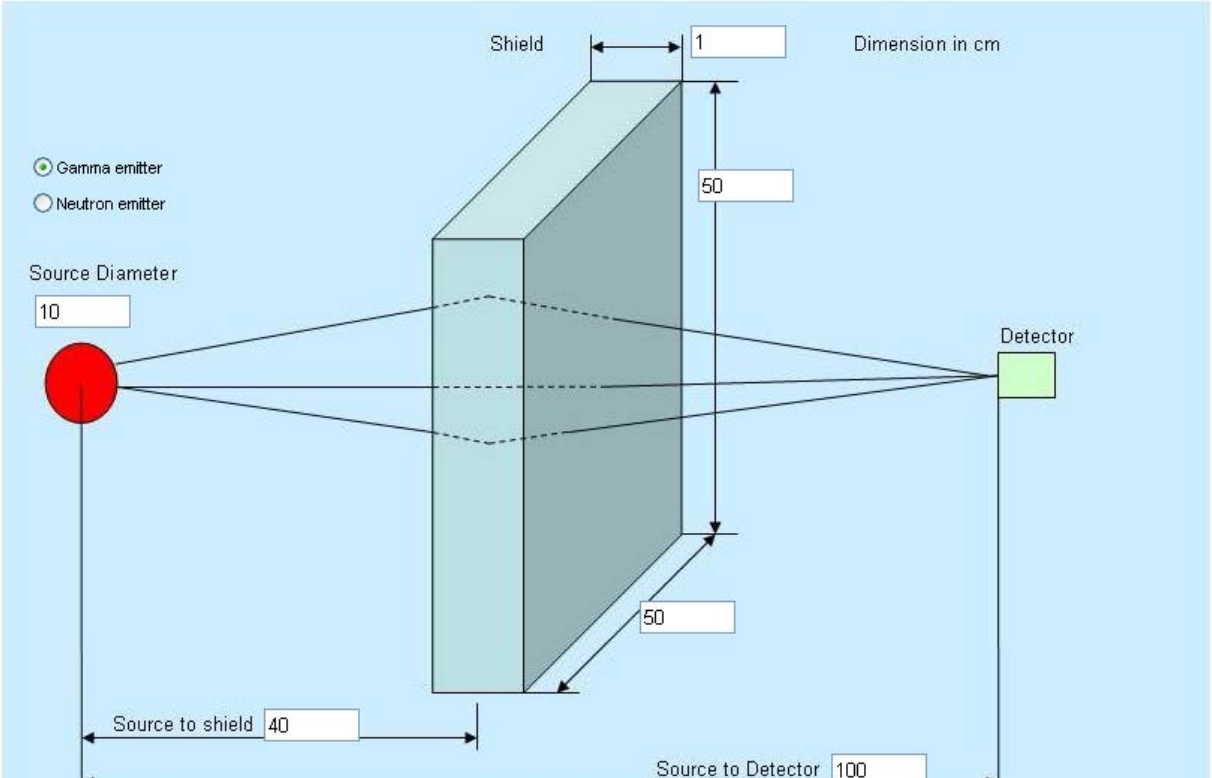
Shield: 1 50 50

Source to shield: 40

Source to Detector: 100

Detector

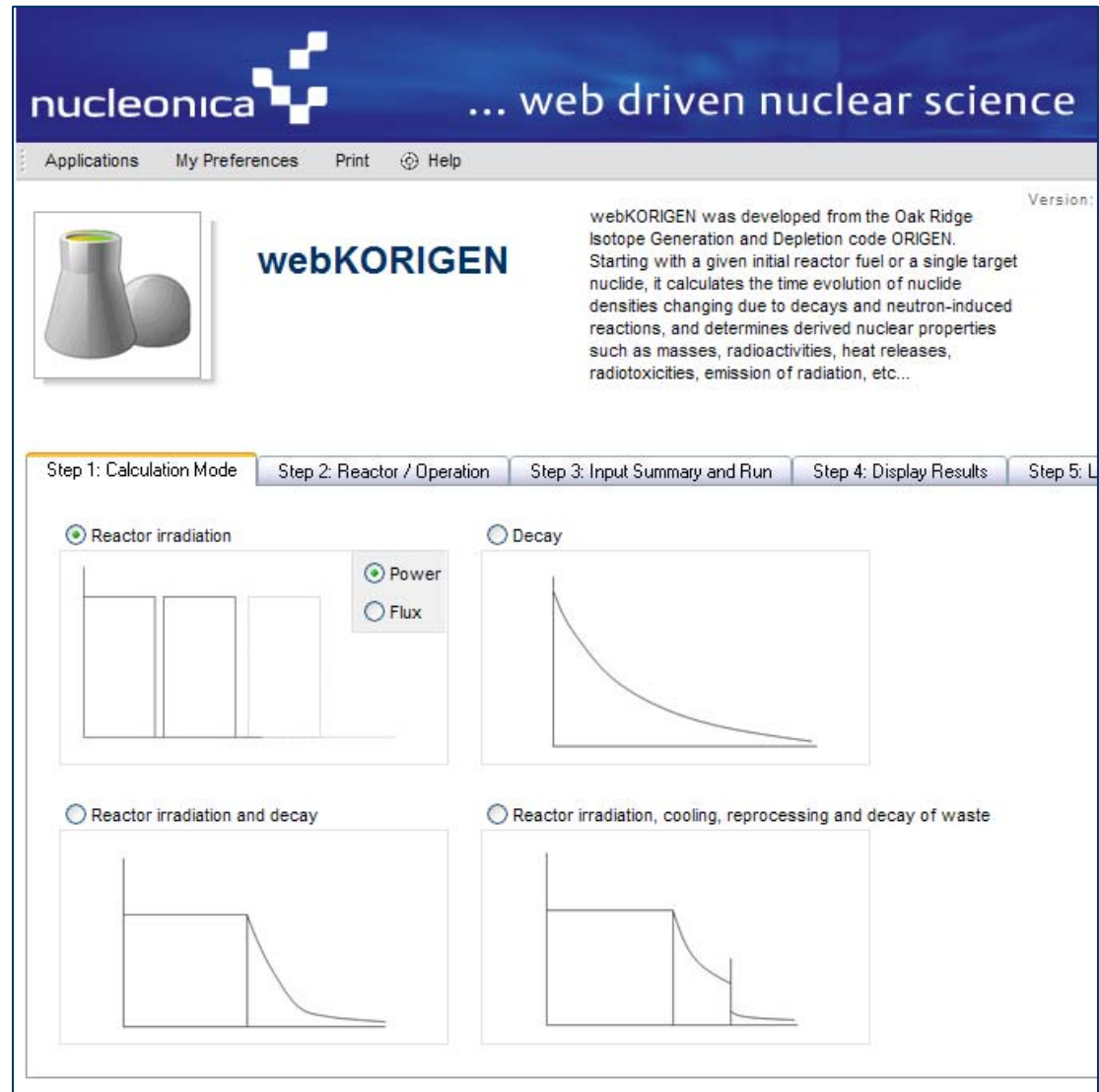
Dimension in cm



NUCLEONICA: New Approach to Knowledge Management, Education and Training: use of social networking tools

Example: webKORIGEN

- KORIGEN is a legacy software code for fuel cycle calculations for PWR, BWR, FRs
- Over 30 man-years of development has gone into KORIGEN
- webKORIGEN is a Joint ITU/FZK development.
- webKORIGEN is a NUCLEONICA web-based application





... web driven nuclear science

Applications My Preferences Print Help



webKORIGEN



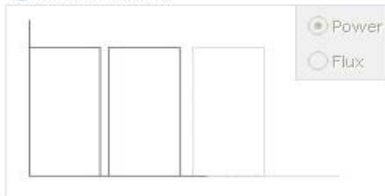
webKORIGEN

Highlight: webKORIGEN

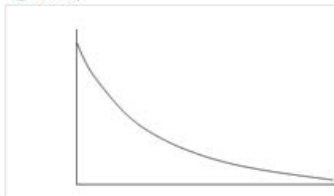
webKORIGEN was developed from the Oak Ridge Isotope Generation and Depletion (ORIGEN) code. Given an initial reactor fuel or a single target nuclide, it calculates the time evolution of nuclear isotopes under neutron-induced reactions, and determines derived nuclear properties such as mass, radiotoxicities, emission of radiation, etc...

Step 1: Calculation Mode Step 2: Reactor / Operation Step 3: Input Summary and Run Step 4: Display Results Step 5: Log files Step 6: Parameters

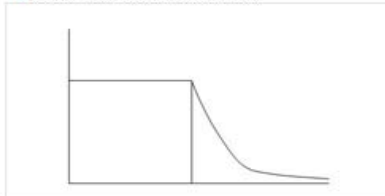
Reactor irradiation



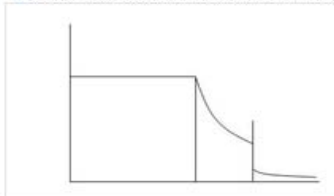
Decay



Reactor irradiation and decay



Reactor irradiation, cooling, reprocessing



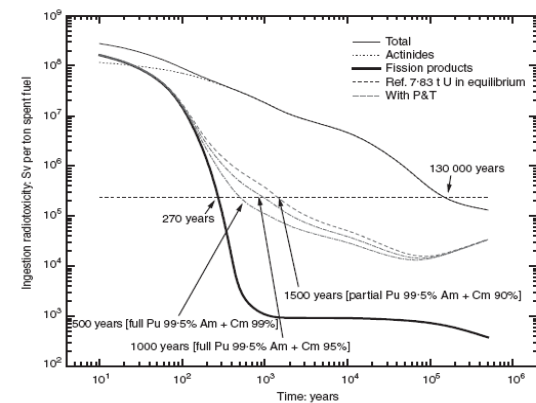
Step 1: Calculation Mode Step 2: Reactor / Operation Step 3: Input Summary and Run Step 4: Display Results Step 5: Log files Step 6: Parameters

Display results for nuclides/elements dominant at 4.8 y irradiation

Display quantity: Mass (g)

Filter:

Plot	Z	Nuclides	Results	Plot	Z	Elements	Results	Plots	Totals	Nuclides	Elements	Results
<input type="checkbox"/>	92	U238	1.840e+7	<input type="checkbox"/>	92	Uranium	1.861e+7	<input type="checkbox"/>	Actinides+Progenies:	83	16	1.887e+7
<input type="checkbox"/>	94	Pu239	1.109e+5	<input type="checkbox"/>	94	Plutonium	2.330e+5	<input type="checkbox"/>	Actinides:	65	8	1.887e+7
<input type="checkbox"/>	92	U236	1.089e+5	<input type="checkbox"/>	54	Xenon	1.744e+5	<input type="checkbox"/>	Transuranics:	40	4	2.608e+5
<input type="checkbox"/>	92	U235	9.936e+4	<input type="checkbox"/>	60	Neodymium	1.214e+5	<input type="checkbox"/>	Minor Actinides:	22	3	2.777e+4
<input type="checkbox"/>	54	Xe136	7.742e+4	<input type="checkbox"/>	40	Zirconium	1.169e+5	<input type="checkbox"/>	Inert Gases from actinides (Rn+He):	3	2	2.757e+1
<input type="checkbox"/>	94	Pu240	5.797e+4	<input type="checkbox"/>	42	Molybdenum	1.092e+5	<input type="checkbox"/>	Fission Products:	711	45	1.126e+6
<input type="checkbox"/>	54	Xe134	5.047e+4	<input type="checkbox"/>	55	Cesium	9.239e+4	<input type="checkbox"/>	Lanthanides:	137	12	3.255e+5
<input type="checkbox"/>	56	Ba138	4.382e+4	<input type="checkbox"/>	58	Cerium	8.774e+4	<input type="checkbox"/>	Rare Earths:	178	14	3.525e+5
<input type="checkbox"/>	58	Ce140	4.168e+4	<input type="checkbox"/>	44	Ruthenium	7.773e+4	<input type="checkbox"/>	Noble Metals:	87	4	1.415e+5
<input type="checkbox"/>	57	La139	4.027e+4	<input type="checkbox"/>	56	Barium	5.028e+4					
<input type="checkbox"/>	55	Cs137	4.018e+4	<input type="checkbox"/>	46	Palladium	4.989e+4					
<input type="checkbox"/>	60	Nd144	3.983e+4	<input type="checkbox"/>	57	Lanthanum	4.035e+4					
<input type="checkbox"/>	58	Ce142	3.782e+4	<input type="checkbox"/>	59	Praseodymium	3.666e+4					
<input type="checkbox"/>	54	Xe132	3.633e+4	<input type="checkbox"/>	38	Strontium	2.786e+4					
<input type="checkbox"/>	59	Pr141	3.622e+4	<input type="checkbox"/>	43	Technetium	2.517e+4					
<input type="checkbox"/>	55	Cs133	3.477e+4	<input type="checkbox"/>	62	Samarium	2.334e+4					
<input type="checkbox"/>	94	Pu241	3.474e+4	<input type="checkbox"/>	93	Neptunium	1.752e+4					
<input type="checkbox"/>	42	Mo100	3.002e+4	<input type="checkbox"/>	39	Yttrium	1.474e+4					
<input type="checkbox"/>	42	Mo98	2.864e+4	<input type="checkbox"/>	45	Rhodium	1.227e+4					
<input type="checkbox"/>	40	Zr96	2.664e+4	<input type="checkbox"/>	36	Krypton	1.157e+4					
<input type="checkbox"/>	0	793	2.000e+7	<input type="checkbox"/>	0	60	2.000e+7					



Conclusions: Key Advantages of Nucleonica

- Keep informed with the latest news on nuclear issues
- Use internationally evaluated nuclear data in your work
- Extensive range of nuclear science applications
- Manage all your data in a single browser-based system and keep track of your recent activities
- Prepare a lecture or a training course with Nucleonica materials (graphics. etc.)
- Prepare publication quality scientific graphs
- Stay in contact with your colleagues from previous employment, workshops or conferences
- Meet scientists from your areas of interest and build up an international contact list and represent yourself and your Institute/Organisation in the international science community



nucleonica



Thanks!



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